

Conclusions and Proposed Program Implementation Modifications¹

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Since European settlement, the Upper Mississippi and Illinois Rivers and their watersheds have been greatly altered by human activity. One of the most significant alterations of the rivers has been the construction of a system of locks, dams, and channel training structures to improve their navigability. River impoundment for navigation purposes initially increased the extent of wetland and aquatic habitat in the river floodplains. However, the continuing delivery of sediment from the system's watershed in combination with the decreased sediment storage and transport capabilities of the regulated (pooled) river system has led to an overall decline in habitat quantity and quality.

Many other human activities and their effects (e.g., changes in basin land cover/land use, implementation of urban flood control projects, continuing point and non-point pollution, and the introduction of non-native species) present additional challenges to the integrity of the river ecosystem.

Human demands on the natural resources of the UMRS are likely to increase over the foreseeable future. Meanwhile, the public will continue to expect the system's environmental qualities to be maintained for their benefit and that of future generations. This is the fundamental reason why the EMP was first authorized in 1986 and why it needs to be continued.

Five overarching conclusions, based on the results of this review of the EMP's outputs, strengths, and weaknesses and future recognized needs of the UMRS, have been drawn:

¹ All recommendations requiring legislative action by the Congress of the United States are presented in Chapter 8 of this report. Institution of the program implementation modifications proposed in this chapter is within the existing purview of the U.S. Army Corps of Engineers.

The UMRS-EMP currently is the single most important and successful program authorized by the Federal government for the purposes of understanding the ecology of the UMRS and sustaining its significant fish and wildlife resources.

Although the National Wildlife Refuge System, NRCS conservation programs, and other government efforts to protect and improve natural resources all have and continue to play very substantial roles in assuring the current health and future sustainability of the UMR ecosystem, they do not individually or collectively provide the balanced combination of monitoring, research, and habitat rehabilitation, protection and enhancement that is unique to the EMP. This is also true of the Corps of Engineers' other environmental restoration authorities. Those authorities provide important site-specific restoration opportunities but lack the systemic perspective that guides and drives the implementation of programs such as the EMP. In addition, these other authorities are not yet of the magnitude necessary to meet the monitoring and research and habitat restoration, protection, and enhancement needs of the UMRS.

The degradation and loss of UMRS aquatic, wetland, and floodplain habitat can be substantially offset by the application of habitat restoration, protection, and enhancement measures. Such measures must be based upon quantitative and qualitative goals that are compatible with the multiple purpose use of this national resource.

The HREP element of the EMP is demonstrating that fish and wildlife habitats can be successfully restored and improved. Traditional, innovative, and experimental construction and resource management approaches have been employed to slow, and perhaps reverse, downward trends in UMRS habitat quality and quantity without constraining other uses of the river system.

A habitat needs assessment (HNA) should be completed to establish a technically sound, consensus-based management framework or "blue print" for the restoration, protection, and enhancement of the UMR ecosystem. This assessment would begin to identify, at the system, pool, and reach levels, the long term habitat requirements and serve to refine the focus of future system monitoring and research activities.

In evaluating the current program and identifying options and alternatives for the future, the Corps of Engineers and the EMP partners recognized that current ecological goals and objectives for the UMRS and quantification and evaluation metrics for the EMP need to be further refined. This refinement process is fundamental to maintaining program focus and realizing maximum program outputs over time.

During the past decade, implementation of the EMP has provided the additional experience, knowledge, and tools necessary to more explicitly state UMR ecosystem goals and objectives. Our understanding of the ecology of regulated rivers has grown, availability of spatial data about the UMRS has increased, and analytical technologies have evolved. These changes allow development of a more comprehensive "blueprint" for future habitat conditions on the UMRS. The accomplishment of a habitat needs assessment, recommended as part of the preferred alternative for the future of the EMP, would increase the resolution of long term, system, reach, and pool-level, environmental goals and objectives. It will also provide additional measures for evaluating the results and tracking the progress of future UMRS habitat restoration, protection, and enhancement efforts and monitoring and research activities.

Increasingly effective management of regulated river systems, such as the UMRS, is dependent upon long term monitoring to detect system changes and applied research to understand system dynamics and relationships.

The LTRM and CIA elements of the EMP are meeting many important UMRS data and information needs and bringing about an expanded understanding of system dynamics, trends, and dependencies. An expanded LTRMP, which incorporates the CIA, is necessary to realize the original monitoring and research expectations of the 1986 WRDA; to support future UMRS comprehensive planning and management initiatives; and to allow full implementation of the suite of recommendations included in recent program science and management reviews. With an increasingly complex array of demands being placed upon the UMRS, an extensive applied monitoring and research program will continue be necessary to balance the system's many uses.

Implementing the EMP has resulted in an unprecedented level of communication and cooperation among the Federal and State partner agencies responsible for UMRS management. However, greater public involvement, outreach, and education also are needed.

One of the greatest and yet most difficult to quantify outputs of the UMRS-EMP has been the increased interaction between UMR resource management agencies and the general public. A heightened understanding of the roles, responsibilities, capabilities and limitations of the many agencies involved with program coordination and management has been acquired, resulting in a better understanding of and appreciation for the many different resource management perspectives that exist. Collectively, these coordination and communication outputs add up to improved working relationships; effective partnerships; and, ultimately, more balanced resource management.

Although participation in the EMP by non-governmental organizations and members of the general public has been expanded, additional coordination and outreach should be pursued to assure that all river constituencies are fully involved in all aspects of program implementation.

LTRMP AND HREP CONCLUSIONS AND PROPOSED PROGRAM IMPLEMENTATION MODIFICATIONS²

The following conclusions and proposed program implementation modifications present the accomplishments and weaknesses of the LTRMP and HREP elements of the EMP and communicate suggestions for changes in the Corps of Engineers' policy, guidance, or program implementation procedures. These proposals were identified during the report formulation and public review process.

I The Long Term Resource Monitoring Program (LTRMP)³

- **The LTRMP is making significant contributions to our understanding of the ecology of the UMRS. Resource managers and decision-makers are increasingly using LTRMP biological, physical, chemical, and land use/cover data to accomplish better river system planning and to make more informed river system management decisions.**
- **LTRMP data and analyses are providing meaningful characterization of system conditions and identification of long term trends. This enables better prediction of the impacts of human and natural actions and allows**

² Conclusions and proposed program implementation modifications specific to the Traffic Monitoring, Economic Impacts of Recreation, and Recreation Projects elements of the EMP are presented in Attachment 3.

³ LTRMP has come to refer to both the LTRM and CIA program elements identified in the EMP's authorizing legislation.

the Corps and others to design, construct, operate, and maintain their UMRS projects in a more environmentally sustainable fashion.

- The LTRMP has established the institutional framework (e.g., sampling protocols, centralized database) and infrastructure (e.g., field stations, equipment) necessary for conducting systemic monitoring and applied research at a level that was previously not possible.
- The LTRMP is increasing the accessibility of UMRS data and information to resource managers and the public.
- The LTRMP must continue to adapt to evolving management data and information needs and advancements in ecological science and technology. This adaptation will require infrastructure modifications, monitoring program changes, and reprioritization of research efforts.
- The LTRMP plays an important role in the planning and implementation of HREP projects. An expanded LTRMP would allow for a much greater level of involvement by the program's science staff in the identification, formulation, monitoring, and assessment of HREPs.
- The LTRMP's acquisition of additional key spatial data coverages (e.g., water depths and velocities, habitat types and distributions, substrate qualities, land ownership) is essential to its ability to support successful river resource planning and management.

I The Habitat Rehabilitation and Enhancement Projects (HREPs)

- HREPs constructed to date have directly restored, protected, or enhanced over 28,000 acres of critical UMRS fish and wildlife habitat.
- Important system-level ecological benefits are known to accrue from the site-specific improvements (e.g., spawning habitat, food resources, nesting opportunities, shelter, etc.) provided by individual HREPs.
- The HREPs have made significant contributions to the science of habitat and ecosystem restoration by developing new and increasingly effective planning tools, engineering designs, and evaluation methods.
- The challenge for the future is to better couple HREP evaluation data, LTRMP systemic data, and decision support tools now available with the experience gained in the design and implementation of HREPs over the past 10 years to shape system-wide habitat restoration, protection, and enhancement strategies.

<i>Proposed Program Implementation Modification</i>
<i>The Corps of Engineers, Mississippi Valley Division should assure that an HNA for the UMRS is completed. The HNA would include quantitative objectives for habitat conditions throughout the UMRS, providing an improved framework for habitat project selection, design, and evaluation.</i>

- Most habitat project implementation costs have declined as a result of evolving HREP planning, design, and construction approaches.
- Corps of Engineers Districts now have over 10 years of experience in the planning, design, implementation, and evaluation of HREPs. Further

delegation⁴ of project approval authority would streamline project implementation and thereby reduce program costs.

<i>Proposed Program Implementation Modification</i>
<i>To reduce habitat project review and approval time and therefore implementation costs, the U.S. Army Corps of Engineers, Mississippi Valley Division should delegate approval authority for those projects with an estimated construction cost of \$1 million or less to the District level.</i>

<i>Proposed Program Implementation Modification</i>
<i>To gain additional project implementation efficiencies, the U.S. Army Corps of Engineers, Headquarters should delegate approval authority for those projects with an estimated construction cost of \$5 million or less to the Division level.</i>

- **HREPs implemented to date have been essentially confined to lands already under public ownership. On the lower two-thirds of the UMRS, limited public land ownership has restricted options for restoring, protecting, and enhancing habitat.**

<i>Proposed Program Implementation Modification</i>
<i>The Corps of Engineers, Headquarters should review and, if necessary, modify current policies and guidance to ensure that HREPs can include obtaining real estate interests from willing sellers when and where such actions are determined to be consistent with and supportive of program goals and objectives.</i>
<i>Any new or revised policy and guidance should include a provision for the government to reimburse the local sponsor for all lands, easements, rights-of-way, relocations, and disposal sites (LERRDs) cost in excess of 25% of the total project cost.</i>

- **Sediment delivery from uplands immediately adjacent to HREP project sites needs to be simultaneously addressed to maximize project life and outputs.**

<i>Proposed Program Implementation Modification</i>
<i>The Corps of Engineers, Headquarters should modify EMP policies and guidance to allow the inclusion of upland sediment controls as part of HREPs in cases where sediment from the local watershed is directly affecting the project area and upland sediment control is a cost-effective measure for achieving project objectives.</i>

- **Most HREPs have met, and in many cases exceeded, their physical and chemical design objectives. Quantitative verification of biological outputs is more difficult to accomplish. Performance (physical, chemical, and biological) monitoring of habitat projects, although costly, is expanding our understanding of habitat requirements of UMRS species. EMP partners have used these performance monitoring results to design more cost-effective projects as the program has evolved.**

<i>Proposed Program Implementation Modification</i>
<i>The U.S. Army Corps of Engineers, St. Paul, Rock Island, and St. Louis Districts should continue the physical, chemical, and biological monitoring of pre- and post-project conditions. Integration of project-specific monitoring with the systemic monitoring activities of the LTRMP should be enhanced. Biological response monitoring of selected habitat restoration, protection, and enhancement measures is essential to evaluating the ecological and cost effectiveness of the HREP program element and should continue to be supported.</i>

⁴ Approval authority for projects with an estimated total construction cost of \$2 million or less was delegated to the Division level in December of 1993.

- Collaborative planning and design of HREPs has identified a number of experimental and innovative project opportunities such as seed islands, small scale drawdowns, wing dam notching, and pool-level management.

<i>Proposed Program Implementation Modification</i>
<i>Future EMP efforts to restore, protect, and enhance UMRS habitat should continue to include an appropriate mix of large-scale actions, which are compatible with other river system purposes, such as pool-scale water level management modifications, and smaller projects affecting limited areas. The U.S. Army Corps of Engineers, St. Paul, Rock Island, and St. Paul Districts should continue to place increasing emphasis on using natural river processes and innovative measures in the design and construction of habitat projects.</i>

<i>Proposed Program Implementation Modification</i>
<i>A concerted effort by the U.S. Army Corps of Engineers, Mississippi Valley Division and Headquarters should be undertaken to identify factors (e.g., project life design requirements, definitions of project failure, and experimental design) that may currently be limiting program innovation. Subsequently, any potentially constraining policies and guidance should be reviewed and, if necessary, modified.</i>

ADDITIONAL GENERAL CONCLUSIONS AND PROPOSED PROGRAM IMPLEMENTATION MODIFICATIONS

- Charters for the EMP-CC and LTRMP A-Team reflecting greater involvement and stronger empowerment of the EMP partner agencies need to be established. These charters would further clarify roles, responsibilities, and expectations of program partners; assure clear lines of communications; and strengthen partnership linkages.

<i>Proposed Program Implementation Modification</i>
<i>The Corps of Engineers, Mississippi Valley Division should facilitate development of charters, within the constraints imposed by Federal law, for the EMP-CC and LTRMP Analysis Team.</i>

- The EMP would benefit from greater participation by all river constituencies.

<i>Proposed Program Implementation Modification</i>
<i>The Corps of Engineers, St. Paul, Rock Island, and St. Louis Districts should increase the level of public involvement in the planning and implementation of the UMRS-EMP. Efforts should be taken to inform the public about habitat project purposes (resource management goals and objectives), expected outputs, and actual performance. In addition, opportunities to support public education that increases general understanding of the UMR ecosystem and management challenges should be pursued.</i>